

is a splendid system and one that is possible of practice by any careful observer, but the ultimate improvement by selection may soon be reached, or rather it may be put this way, that by selection, there is no fresh introduction of new blood into the plant to excite a variation in the direction of an improved character, which means that it is impossible to raise the quality of a given variety above its best specimen. Of course, if the average crop were raised to the standard of the best individuals, the total enhanced value would be enormous, but the average can never be as high as the best, and plant breeders have gone a step farther to secure improvement.

This next step is called "regeneration" and is carried out by fertilizing the flower of one plant with the pollen or "bloom" of another of the same variety, and this crossing of the reproductive organs so disturbs the natural course that plants having extreme characteristics are produced. From these plants having extreme characteristics, those whose extremes are in the direction of improvement are selected and re-selected just as Messrs. Dow describe, until a type very much superior to the best of the original stock is produced. Thus, grain or grasses are "regenerated" and this is the most useful of all scientific practices in connection with the rapid improvement of grain crops. It is also the next in simplicity to selection as outlined by the Canadian Seed Growers' Association for practice by farmers. "Regeneration" although simple, cannot be practised with any degree of success by amateurs. It is the work of a skilled plant breeder.

Then the plant breeder can set up greater variation and secure further extremes by crossing different varieties, and still farther by intermixing several varieties, from which operation enhanced characteristics are secured and by this means the possibility of raising the average quality of a type of grain is carried still further.

Attention is called here to these scientific facts that our readers may not be under the impression that selection, with all its advantages, marks the ultimate extent of improvement in plants, and to prepare a way for the reception of genuinely improved forms when they are offered as improvements over the commonly grown varieties.

On Selecting Seed to Improve Crops

EDITOR FARMER'S ADVOCATE:

There are many who are not convinced of the value of a system of selection as applied to the improvement of seed, or who consider the prices generally asked for seed thus produced are excessive. How many are there who will deny the value of selection as it has been applied to live stock for so many years? Who would, for a moment, think of breeding from stock of purely mongrel ancestry? Yet this is simply what has been the general practice up to within a few years in the case of plants, where the opportunity for improvement is undoubtedly greater than with live stock.

Our pure-bred stock has been brought to its present high standard mainly by the selection of desired types. Of course, cross-breeding was necessary in the production of the different breeds, but the foundation once laid, all further improvement may be said to have been gained by selection within the strain, cross-fertilization being little more than the means of combining and perpetuating the desirable variations.

This system of cross-breeding for the production of new breeds or varieties, although not greatly taken advantage of until comparatively recent years, and not so easily available to the general breeder, is equally open to the plant improver as to the stockman. Why should it not give equally as good results?

If one has a sow which produces eight or nine young at a litter and another which farrows but three or four, will he not rightly consider the progeny of the former the best to breed from? Or would one breed from a horse which is badly blemished in preference to another which is clean limbed and sound? Why then, if we go into a field of wheat and find a plant producing but two heads of small size, should we consider it as good to raise seed from as the next one, having perhaps, six or eight heads of larger size? Or, if we examine a field of oats and find one plant badly rusted and another perfectly free of this blemish, should we not prefer the latter for the production of seed? As a matter of fact, experience has shown that selection does give equally as good, if not better, results in plant effects. It might be mentioned that in 1907, when so much of the oats were of very low vitality,

and when our crops, in common with others, seemed to stand still for days, we took the precaution, at threshing time, to save samples from each load of our registered oats and from this, after being thoroughly mixed, an official soil test gave a germination of 98 per cent plants being strong.

The advantage which is gained by cross-fertilization in live stock is offset by a tendency to produce other variations than those desired, as well as by the fact that as animals produce but few of their kind, it takes much longer to produce a required quantity of improved individuals. Then, too, where the stockman deals with tens, the plant improver has thousands to choose from, the chance of desirable variations thereby being greatly increased, even though it be admitted that they do not occur in the same proportion as with the animals.

When, therefore, the length of time in which stock-breeding has been carried on, is taken into consideration, the opportunity for improvement is greatly in favor of the plant-breeder, further improvement being, naturally, more difficult in proportion to the higher standard already reached. Even though the plant improvers do no more than raise the quality and productiveness of their seed up to the average of the best plants selected, the room for betterment is vast. It is surprising to find how many plants there are, even in a field of good quality, which produce but one or two heads. Anyone who has had experience in the selection of seed, knows that, while a field of grain may appear, from the outside, to be so uniform as to make the selection of the best heads an exceedingly easy thing, yet upon entering the plot and closely examining the plants individually, the difficulty is really the reverse. To one entering such a plot with a certain ideal in mind, and beginning a search for individuals approaching that ideal, the outstanding impression is that he has undertaken a hopeless task, as it would seem impossible, among such an aggregation of types and characters, to find anything approaching it. However, having determined to accept the best obtainable, and confining his attention to their discovery, he finds there are many desirable plants, and the work goes on till the required quantity is selected, or the plot has all been gone over.

It may seem to those who have had no experience in the production of selected seed that the prices asked are rather high. However, when everything has been considered, we think this is not the case, and that these prices compare favorably in proportion to the difference prevailing between the prices of live stock of ordinary quality and those of high grade.

It should be remembered that the work of selection, when properly carried on, entails a good deal of work. We have seen various statements as to the amount of grain which can be secured by a day's selecting. While these may not be exaggerated as to the amounts picked, we will venture the assertion that the work will not have been properly done. We have seen wheat grown from selected seed where the heads, though of large size were of all types from the long, thin, pointed and open, to those of short, stout and close formation. These had evidently been secured from a hurried selection without regard to type. As for our own experience, last season two of us were six days selecting and in that time picked only enough for 63 pounds of oats and 60 of wheat. Of course, this may be the other extreme, but good work cannot be done without plenty of time.

This work, too, must be undertaken at a time when the farmer is in the midst of his busiest season, when, therefore, his labor is more valuable than at any other part of the year, a time, too, when help is always scarce. Indeed if a farmer be dependent on hired help, it will be difficult for him to take up the work of selection on a scale large enough to produce seed for sale, especially on some such system as carried on by the Canadian Seed Growers' Association, where special plots must be maintained and properly prepared.

Quite apart from other considerations, registered or selected seed is really cheaper than the ordinary quality at prevailing prices. An increase of only one bushel an acre will make up the difference in price. Thus if a farmer sell his wheat at 75 cents a bushel and buys selected seed at \$1.25, he disposes of 2½ bushels to obtain 1½, a difference of one bushel or 75 cents an acre. There is no doubt that selected seed will return several bushels per acre over the ordinary quality. "The McDonald-Robertson Seed Competition," forerunner of the Canadian Seed Growers' Association, and covering all Canada, showed an increased yield of slightly over 10 bushels per acre in three years. Allowing that half this may be accounted for by the small size of the fields and other considerations, and saying nothing of further improvement in those strains which have been continuously selected for five years since, we have the comfortable margin of five bushels in favor of the selected seed, or taking the above price a clear gain of three dollars per acre over the ordinary quality.

Gilbert Plains Mun., Man. Dow Bros.

Managing a Weed-infested Farm

EDITOR FARMER'S ADVOCATE:

The question, what should a farmer do when his farm becomes so badly infested with weeds that half, or more, of the crop grown is weeds of one kind or other, and what line of farming in those circumstances is likely to produce profitable returns, is one that might be answered in various ways. The old Manitoba answer, years ago, was to go into mixed farming. Well, we are into "mixed" farming and our effort now should be to get out of it as quickly as possible, as it is not the right kind. Growing half weeds and half grain is a poor kind of "mixed" farming.

In my opinion the man on the weedy farm has this problem before him:—he wants to clean the place up and at the same time get into a line of farming that he can make money at. The question is:—how can this be done? Stock raising, that is, raising beef cattle, at present beef prices is hardly likely to prove a profitable proposition, but a good bunch of dairy cows always brings in a good revenue. To keep cows means that you have to raise hay and hoe crops, which of course help to clean the land. Then, if a man has a good mare or two, he can raise a few colts each year, which, at present prices, are profitable. Hogs, too, are profitable at the present time. To raise hogs we have to grow barley, and by growing barley—if we do it properly—the land is cleaned of weeds.

Seeding to grass is of great value in fighting weeds. The land is given a rest and is generally pretty well cleaned by cutting hay off it. We aim to keep one hundred acres seeded down to timothy all the time. When broken up and put to wheat again, it always yields well, averaging sometimes as high as 40 bushels per acre. Clover is another valuable agent in the building up of soil. We have tried it for a few years in a small way with satisfactory results. If the farmers of Manitoba can make a success with this crop, it will be a great help to them and to the province. At present, one of the serious drawbacks to seeding to clover is the high price of seed.

In conclusion, I would advocate for the old and weedy farm, less wheat, more hoe crop, more barley, more hay and more summer fallow. Also the proper management of these various crops that the most may be accomplished in the eradicating of weeds and the maintenance of the fertility of our soil.

Man.

H. S.

Drifting and Hard Pan

EDITOR FARMER'S ADVOCATE:

Everyone in our district is puzzling over the condition of their land. In the fall, when we come to plow, there is about three or four inches on top that is dry and loose, like an ash bed, but the plow runs along on a hard furrow bottom, into which we cannot get the share down.

Morton, Mun., Man.

F. A. J.

The condition complained of by our correspondent is very prevalent in many parts of the West, and arises largely from repeated crops of grain year after year without any grass between them. By this plan, the soil is deprived of nearly all its vegetable fiber and a large part of its humus. It has very little ability to hold moisture and often drifts badly with the wind. The remedy is to seed such land to some good grass, selecting the variety best adapted to the locality, leave the grass from two to three years and it will fill the land with vegetable fiber which, later on, decays and provides humus. This humus is full of plant foods, and a good retainer of soil moisture. By filling the soil with the fiber of grass roots, it prevents it from drifting with the wind.

The hard pan formed at the bottom of the furrow is caused by plowing at a uniform depth at all seasons of the year. This is not the plan recommended by the best authorities: they advise that from the time of breaking new land, the depth should be gradually increased until the maximum is reached, which will vary with different soils but is generally about six or seven inches. The increase should be made in fall plowing or in summer fallowing. This enables the sun and frost to sweeten the soil before the seed is sown. If the increase in depth is made with spring plowing it often brings to the surface a hard cold soil which remains hard even after harrowing and the grain is sown under very unfavorable conditions for germination and growth. When the maximum depth is reached it should then be plowed at varying depths, making the fall plowing deep and the spring shallow, this will prevent a hard furrow sole being formed.

M. A. C.

S. A. BEDFORD.

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No questions come along the line. We presume that you do not understand, and that there is some mystery about it, and that you grasp the theory and the practice. If cows always sit in the cream separator, if cream separators are always present in the cream separator, if persons handling milk are always present in the cream separator, there would be no brains over testing it.

Feed

EDITOR FARMER'S ADVOCATE:

I am thinking of what kind of feed we should use. I also intend growing a chop and using straw. I want to grow all the feed that can be grown on the place. I appreciate it.

Sask. Spring rye cut just fair hay, but is more allowed to become a cattle reject. It is while it lasts, but it is not good for anything. Could you not grow best and most productive feed for milk production? Have you ever considered your cows? I follow a system was about a first cut fall rye, which as long as it lasted, then clover, vetches, every day as required stage, when I cut and stalks until rye came stable was an open side facing the field, pitching off the loads, manger. I found that milk when this plan area of land was required.

In this country I have best and pasture, occasional plowing, remain productive for comes next and West. Many speak highly of Essex rape, or rape, taint the milk somewhat for milking cows. of our most progress bushel or less of wheat fallow and feed it off too heavy, this plan the surface should be in spring before seed, bake and greatly reduced soil, this plan is not a M. A. C.

Winter Dairy Editor FARMER'S ADVOCATE: Last fall, I noticed asking what was the district that was liable to out. A few weeks ago for suggestions for I have had experience in were liable to occur, and my experience was similar position. The writer started with little capital and twice hauled and once met our household expenses derived from we aim to have return the returns during the factory. Some months very large, but they groceries. There are get suitable buildings but the longer they wait. Personally, I do not just so long as the during an occasional comfortable and feels smart stable she is liable to her appetite will be petite of the cow in the warm stable will be fine. And not only her appetite about his father, her too. By babying a cow milk, but it costs too much. My stable is only a of ventilation is equally I just leave some of the